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<p>(21) International Application Number: PCT/SE98/02378 (22) International Filing Date: 18 December 1998 (18.12.98) (30) Priority Data: 9704813-6 19 December 1997 (19.12.97) SE (71) Applicant (for all designated States except US): TERACOM AB [SE/SE]; P.O. Box 17666, S-118 92 Stockholm (SE). (72) Inventors; and (75) Inventors/Applicants (for US only): REBHAN, Richard [SE/SE]; Rödabergsgatan 12, S-113 33 Stockholm (SE). KARLSSON, Pierre [SE/SE]; Bäckdalsvägen 3, S-141 37 Huddinge (SE). RUOTTINEN, Per [SE/SE]; Skeppargatan 83, S-115 30 Stockholm (SE). OSSFELDT, Jan [SE/SE]; Diamantgängen 219, S-135 49 Tyresö (SE). (74) Agents: GRAUDUMS, Valdis et al.; Albihns Patentbyrå Göteborg AB, P.O. Box 142, S-401 22 Göteborg (SE).</p>		<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>
<p>(54) Title: METHOD FOR TRANSFERRING INFORMATION</p> <p>(57) Abstract</p> <p>A method for transferring information from an information provider (100) to an information consumer (190) in a highly efficient manner by means of a digital video broadcasting (DVB, 140) system and a secondary bidirectional transfer network (130). The secondary bidirectional transfer network provides information of where the DVB receiver (191) of the information consumer is located so that only suitable DVB transmitters (146) in the area are used for the information transfer itself. The location is determined by having at least one of either the transmitter frequency, the original network identification, the transport stream identification, and/or the network identification, of a transport stream of one transmitter that the receiver can receive transferred via the secondary bidirectional transfer network. Thereby only the necessary DVB transmitters need to be used for the information transfer, thus relieving the rest of the DVB transmitters (145, 147) from an unnecessary downloading.</p>		

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Method for transferring information

FIELD OF THE INVENTION

5 The present invention relates generally to a method of
information transfer, for example an electronic map,
multimedia applications or the like, with one or more
radiofrequency receivers such as mobile, portable, and
stationary radiofrequency receivers, especially to a single
10 predetermined digital video broadcasting (DVB) receiver.

BACKGROUND TO THE INVENTION

There exists a number of different methods of transferring
information from an information/content provider to an
information consumer, i.e. to the destination where the
15 information/content is intended to be used. In order to
transfer information to an information consumer there must
be some means for localizing the information consumer,
which in some circumstances can be a problem. If the
information consumer is stationary then the problem might
20 arise the first time an information transfer is to take
place. On the other hand if the information consumer is
mobile, then, depending on the method of transfer, the
information consumer might have to be localized anew for
each information transfer that is to take place. Another
25 problem is how to transfer the information in an effective
manner, both from an economic as well as from a time point
of view, the information is perhaps no good tomorrow and it
must be affordable to get it.

A mobile telephone system is an information transfer system. Voice information in the form of analog or digital information and also possibly pure digital data. A mobile telephone system addresses the previously mentioned problems in a manner intended to be efficient mainly for speech. A mobile telephone system, GSM (Global System for Mobile communication) for example, is a two-way communications system that uses cells in which transfer of information between a mobile telephone and a base station occur. As long as a mobile telephone is powered up (and even when on-hook) an intermittent exchange of information between the mobile phone and the base station of a cell in question takes place. The information exchange that takes place when the mobile phone is on-hook is, among other things, used for keeping track of the mobile phone. The base station in question passes this information on to a central database that the mobile telephone operator maintains to keep track of where all the mobile telephones are located, i.e. in what cell or group of cells they are for the moment. When a request to establish contact with a mobile phone is made then an inquiry to the central database is made to find out in which cell the mobile phone is located so that the call can be directed to the appropriate base station for a subsequent correct radio communication setup. Unfortunately a mobile telephone system has a relatively narrow bandwidth, i.e. the information transfer rate capacity is fairly low as its main purpose is to bidirectionally transfer speech which does not require a very high transfer rate.

A DVB (Digital Video Broadcasting) system, i.e. a broadcasting system, can have a similar cell structure as a mobile telephone system has, but DVB is a one-way broadcasting system, i.e. there is no way a DVB receiver can communicate with a DVB transmitter within the DVB system. The local DVB transmitter does not know which DVB

receivers are tuned in or which DVB receivers can receive the transmitter or if any DVB receiver at all can or is receiving for that matter. A desire to transfer information to a specific DVB receiver and ensure that the DVB receiver has a theoretical chance of receiving the information would therefore involve transmitting this information across all cells that the DVB receiver might be located in, which usually means the whole DVB network and also over all the different frequencies used in the DVB network. This will result in an extremely poor usage efficiency of a DVB network even though a DVB system has a relatively large bandwidth, i.e. the information transfer rate capacity is very large to be able to serve its main purpose of broadcasting television to a large number of recipients. Unfortunately it could be argued that the described method does not use the DVB broadcasting system in a very effective manner since system bandwidth in the whole DVB network is used for the purpose of an information transfer of information which only has a value in a very limited area to perhaps a very limited number of receivers.

There seems to be no manner in which to transfer information in a DVB system to a predetermined single DVB receiver without having to download the whole system with the information, and especially not how to transfer this information in a secure manner.

SUMMARY OF THE INVENTION

An object of the invention is to define a method for providing an efficient manner of transferring information via a digital video broadcasting system to one or more predetermined information consumers.

Another object of the invention is to define a method which is able to transfer information in a digital video broadcasting system in a safe, error tolerant and efficient manner without using more bandwidth than necessary of the digital video broadcasting system.

The above-mentioned objects are achieved in accordance with the invention by a method for transferring information from an information provider to an information consumer in a highly efficient manner by means of a digital video broadcasting (DVB) system and a secondary bidirectional transfer network. The secondary bidirectional transfer network provides information of where the DVB receiver of the information consumer is located so that only suitable DVB transmitters in the area are used for the information transfer itself. The location is determined by having for example a network identification of the transmission stream that the receiver can receive transferred via the secondary bidirectional transfer network for identification of the transmitter or transmitters used. Thereby only the minimum number of necessary DVB transmitters needs to be used for the information transfer, thus relieving the rest of the DVB transmitters from an unnecessary downloading.

The aforementioned objects are also achieved according to the invention by a method for transferring information from an information provider to a predetermined information consumer. The information is transferred by means of a digital video broadcasting system to a digital video broadcasting receiver of the predetermined information consumer. To enable an efficient information transfer when a demand to transfer information to the predetermined information consumer is originated by the information provider the information transfer is supported by a secondary bidirectional transfer network such as NMT (Nordic Mobile Telephone), GSM (Global System for Mobile

communication), PSTN (Public Switched Telephone Network), Internet, or the like. The method comprises a number of steps. First the information provider establishes contact with an information transfer point for requesting transfer of information to the predetermined information consumer. The information transfer point can be part of the information provider, part of the DVB system, or a separate service. Thereafter the information transfer point retrieves access information of the predetermined information consumer based on the request from the information provider. As a third step the information transfer point establishes an initial contact with the predetermined information consumer based on the retrieved access information about the predetermined information consumer. Thereafter the predetermined information consumer provides the information transfer point, via the secondary bidirectional transfer network, with transfer configuration information comprising, in dependence on the specific DVB network, at least one of the transport stream identification, the network identification, the original network identification, and/or the transmitter frequency which identifies a transmitter and transport stream that the digital video broadcasting receiver of the predetermined information consumer receives or can receive. Finally the information provider via the information transfer point, based on the transfer configuration information, transfers information over the digital video broadcasting system to the digital video broadcasting receiver of the predetermined information consumer to thereby transfer information from the information provider to the predetermined information consumer in an efficient way.

Suitably the method advantageously also, based on the transfer configuration information, has the information transfer point transfer the information to the digital

video broadcasting receiver of the predetermined information consumer over a selected transmitter or transmitters in the digital video broadcasting system.

5 The access information of the predetermined information consumer preferably provides information of how contact can be made with the predetermined information consumer via the secondary bidirectional transfer network and that the step of establishing an initial contact with the predetermined information consumer is done via the secondary
10 bidirectional transfer network based on the access information of the predetermined information consumer. If the step of establishing initial contact with the predetermined information consumer via the secondary bidirectional transfer network cannot be concluded then preferably a broadcast over the digital video broadcasting system is performed to alert the predetermined information consumer to establish contact with the information transfer point. If the information transfer point after a timeout has not been able to establish contact with the
15 predetermined information consumer then preferably the information provider is notified that the predetermined information consumer cannot be positively contacted.

25 The access information of the predetermined information consumer can alternatively advantageously either provide no information on how contact can be made with the predetermined information consumer via the secondary bidirectional transfer network or provide information of how the predetermined information consumer is to be contacted by means of broadcasting over the digital video
30 broadcasting system to thereby alert the predetermined information consumer to establish contact with the information transfer point and that the step of establishing an initial contact with the predetermined information consumer is done via a broadcast over the

digital video broadcasting system to thereby alert the predetermined information consumer to establish contact with the information transfer point. If the information transfer point after a timeout has not been able to establish contact with the predetermined information consumer then preferably the information provider is notified that the predetermined information consumer cannot be positively contacted.

The transfer configuration information can further advantageously also comprise at least one of either the transport stream identification, the network identification, the original network identification, and/or the transmitter frequency which identifies the transmitter and transport stream of all transmitters receivable by the digital video broadcasting receiver of the predetermined information consumer, the field strengths of all receivable transmitters, what program/transport stream if any the digital video broadcasting receiver of the predetermined information consumer is currently receiving, or alternative information transfer routes. The information transfer point can, based on the transfer configuration information, in some embodiments of the invention determine when and with what transport stream the information transfer is to take place and by means of the secondary bidirectional transfer network notify the predetermined information consumer of when and with what transport stream the information transfer is to take place. In some other embodiments the decision for what, if any, alternative transport stream the information transfer should use can suitably be made by the information consumer or the digital video broadcasting receiver of the information consumer.

In some versions/embodiments of the invention increased security of the information that is to be transferred is of increased concern and these comprise further steps. In a

first additional step the information transfer point transfers a crypto key to the predetermined information consumer by means of the secondary bidirectional transfer network before, during or after transferring information over the digital video broadcasting system. The information to be transferred is encoded either by the information provider or by the information transfer point. Decoding of the transferred information is performed by means of the transferred crypto key either in the digital video broadcasting receiver of the predetermined information consumer or by the predetermined information consumer. When a high reliability of the transfer of the information is necessary the method according to the invention further comprises the following steps. First transferring checksums or the like, of the information that has or will be transferred via the digital video broadcasting system, via the secondary bidirectional transfer network to the predetermined information consumer. Secondly checking the transferred information if it is uncorrupted based on the transferred checksums or the like. Checking is performed in the digital video broadcasting receiver of the predetermined information consumer or by the predetermined information consumer. Thirdly the digital video broadcasting receiver of the predetermined information consumer or the predetermined information consumer makes a request to the information transfer point of a resending of corrupted transferred information. The request is made via the secondary bidirectional transfer network.

The aforementioned objects are also achieved by a method for transferring information from an information provider to an information consumer by means of a digital video broadcasting system to a digital video broadcasting receiver of the information consumer. The transfer is executed with support of a secondary bidirectional transfer

network to thereby enable an efficient information transfer when a demand to transfer information to the information consumer is originated by the information consumer. The method comprises a number of steps. First of all the information consumer establishes an initial contact with an information transfer point via the secondary bidirectional transfer network with a request for an information transfer from the information provider to the information consumer. The information transfer point can be part of the information provider, part of the DVB system, or a separate service. Then the information consumer provides the information transfer point, via the secondary bidirectional transfer network, with transfer configuration information comprising, in dependence on the specific DVB network, at least one of the transport stream identification, the network identification, the original network identification, and/or the transmitter frequency which identifies a transmitter and transport stream that the digital video broadcasting receiver of the predetermined information consumer receives or can receive. The information transfer point retrieves the requested information. Thereafter the information provider via the information transfer point, based on the transfer configuration information, transfers information over the digital video broadcasting system to the digital video broadcasting receiver of the information consumer to thereby transfer information from the information provider to the information consumer in an efficient manner.

The method advantageously also, based on the transfer configuration information, has the information transfer point transfer the information to the digital video broadcasting receiver of the information consumer over a selected transmitter or transmitters in the digital video broadcasting system. The transfer configuration information can further advantageously also comprise at

least one of either the transport stream identification, the network identification, the original network identification, and/or the transmitter frequency which identifies the transmitter and transport stream of all transmitters receivable by the digital video broadcasting receiver of the predetermined information consumer, the field strengths of all receivable transmitters, what program/transport stream if any the digital video broadcasting receiver of the predetermined information consumer is currently receiving, or alternative information transfer routes. The information transfer point based on the transfer configuration information can in some embodiments of the invention determine when and with what channel the information transfer is to take place and by means of the secondary bidirectional transfer network notify the information consumer of when and with what channel the information transfer is to take place.

The information transfer point can preferably confirm the availability or non-availability of the requested information to the information consumer via the secondary bidirectional transfer network or via the digital video broadcasting system.

In some versions/embodiments of the invention increased security of the information that is to be transferred is of increased concern and these versions/embodiments comprise further steps. In a first additional step the information transfer point transfers a crypto key to the information consumer by means of the secondary bidirectional transfer network before, during or after transferring information over the digital video broadcasting system. The information to be transferred is encoded either by the information provider or by the information transfer point. Decoding of the transferred information is performed by means of the transferred crypto key either in the digital

video broadcasting receiver of the information consumer or by the information consumer. When a high reliability of the transfer of the information is necessary the method according to the invention further comprises the following additional steps. First transferring checksums or the like, of the information that has or will be transferred via the digital video broadcasting system, via the secondary bidirectional transfer network to the information consumer. Secondly checking the transferred information if it is uncorrupted based on the transferred checksums or the like. Checking is performed in the digital video broadcasting receiver of the information consumer or by the information consumer. Thirdly the digital video broadcasting receiver of the information consumer or the information consumer requesting, via the secondary bidirectional transfer network, to the information transfer point a resending of corrupted transferred information.

The aforementioned objects are also achieved by a method for transferring information from an information provider to an information consumer by means of a digital video broadcasting system to a digital video broadcasting receiver of the information consumer. The transfer is executed with the support of a secondary bidirectional transfer network to thereby enable an efficient information transfer when a demand to transfer information to the information consumer is originated by the information consumer. This method according to the invention is specifically advantageous when an information consumer is receiving a programme/channel generated from a service provider and the information consumer desires more information from that service provider. The programme/channel can, for example, be a historical programme that comprises tags that an information consumer can interpret and use as a request for more information (such as background information) to the service provider

which then also becomes an information provider. In another example the programme/channel can be fed by an internet server that continuously feeds the transport stream with information from the internet (the information provider), requested and/or from a standard set, together with its own IP-address or other server identification. The information consumer will then provide the information transfer point with requests for, for example, home pages and the IP-address these home pages should be sent to, i.e. the IP-address of the server that the information consumer is listening to via the digital broadcasting system. The information transfer point will then provide internet with the request for information and where the requested information should be sent, by means of the IP-address. The internet server with the mentioned IP-address will receive the requested information and add this to the transport stream that the information consumer receives. The method according to the invention comprises a number of steps. First of all the information consumer establishes an initial contact with an information transfer point via the secondary bidirectional transfer network with a request for an information transfer from the information provider to the information consumer. The information transfer point can be a part of the information provider, part of the DVB system, or a separate service. Then the information consumer provides the information transfer point, via the secondary bidirectional transfer network, with transfer configuration information comprising at least one of either what currently received programme/transport stream (such as BBC4) or information therein (such as an IP-address) that the digital video broadcasting receiver of the information consumer receives. Thereafter the information transfer point forwards the information request and the transfer configuration information to the information provider. Finally the information provider, based on the transfer configuration information, transfers

information over the digital video broadcasting system to the digital video broadcasting receiver of the information consumer to thereby transfer information from the information provider to the information consumer in an efficient way.

The transfer configuration information can further also advantageously comprise at least one of either a transmitter frequency, an original network identification, a transport stream identification, and/or a network identification of a transport stream of a digital video broadcasting transmitter that the digital video broadcasting receiver of the information consumer can receive.

The method advantageously also, based on the transfer configuration information, transfers the information to be transferred to the digital video broadcasting receiver of the information consumer over a selected transmitter or transmitters in the digital video broadcasting system. The transfer configuration information can still further also advantageously comprise at least one of either a transmitter frequency, an original network identification, a transport stream identification, and/or a network identification, of transport streams of transmitters receivable by the digital video broadcasting receiver of the predetermined information consumer, the field strengths of receivable transmitters, or alternative information transfer routes.

In some versions/embodiments of the invention an increased security of the information that is transferred is obtained by having the method according to the invention comprise further steps. In a first additional step the information transfer point transfers a crypto key to the information consumer by means of the secondary bidirectional transfer

network before, during or after transferring information over the digital video broadcasting system. The information to be transferred by the information provider is encoded. In a final additional step decoding of the transferred information is performed by means of the transferred crypto key either in the digital video broadcasting receiver of the information consumer or by the information consumer. The method can advantageously also comprise a number of additional steps to ensure a high reliability. This is accomplished by first transferring checksums or the like, of the information that has or will be transferred via the digital video broadcasting system, via the secondary bidirectional transfer network to the information consumer. Thereafter checking the transferred information if it is uncorrupted, based on the transferred checksums or the like, checking is performed in the digital video broadcasting receiver of the information consumer or by the information consumer. Finally the digital video broadcasting receiver of the information consumer or the information consumer requesting, via the secondary bidirectional transfer network, to the information transfer point a resending of corrupted transferred information.

By providing a method for transferring information from an information provider to an information consumer over only selected parts of a digital video broadcasting system/network, a plurality of advantages over prior art systems are obtained. By providing information to an information transfer point of which DVB transmitters is and optionally which can be received by the information consumer then the information transfer can be directed accordingly without having to download the whole system. The information needed by the information transfer point is transferred to it by means of a secondary bidirectional transfer network which can be a readily available telephone network such as GSM. A high security is obtained by

transferring crypto keys and the like directly to the information consumer by means of the secondary bidirectional transfer network which in that case preferably is a point to point transfer network. High reliability is obtained by using the secondary bidirectional transfer network as a back channel for requests for resending faulty blocks of data. By combining a cheap, since the whole system bandwidth is not used, high capacity broadcasting system and a lower capacity or more expensive secondary bidirectional transfer network an efficient manner of transferring information is obtained according to the invention. Another advantage of the invention is the ability to be able to identify an information consumer either by the DVB receiver identity, the identity of the secondary bidirectional transfer network transceiver, another identifier which is hardware independant, or an arbitrary combination of the above.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail for explanatory, and in no sense limiting, purposes, with reference to the following figures, in which

- Fig. 1 shows a block diagram of one embodiment of a system according to the invention,
- Fig. 2 shows a flow chart of a method according to the invention,
- Fig. 3 shows a flow chart of another method according to the invention,

Fig. 4 shows a flow chart of how a high security and error tolerance is accomplished according to one method of the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

5 In order to clarify the system according to the invention, some examples of its use will now be described in connection with Figures 1 to 4.

Figure 1 shows a block diagram of one embodiment of a system according to the invention. As indicated in the figure and below, certain parts can form smaller or larger groups. The information that is to be transferred to an information consumer / terminal 190 can be found at an information / content provider 100. The other parts that make up the system are an information transfer point / a service provider 110, an access information database 120, a digital video broadcasting (DVB) network / a network provider 140 with associated cells 145, 146, 147, a secondary bidirectional transfer network / an interaction network 130, an information consumer / terminal 190 with a DVB receiver 191 and a transceiver 192 for the secondary bidirectional transfer network 130 and optionally means 199 for handling encrypted transmission. The access information database 120 is used to identify the secondary bidirectional transfer network 130 and access in that network to an information consumer. The invention is not dependent on the exact physical closeness of the different parts, logically the information consumer 190 is preferably apart from the other parts 100, 110, 120, 130, 140 of the system. For example the information transfer point 110 might be part of the information provider 100, or form part with the access information database 120 and the DVB network / system 140, or be a completely independent

service. As mentioned there are many possibilities, but they do not affect the invention.

Basically the invention locates the information consumer 190 and directs the information only to the whereabouts of the information consumer 190. The invention utilizes a
5 broadcasting system 140 for transfer of information to the information consumer 190. A broadcasting system is very effective in transferring information to many receivers. Sometimes a broadcasting system is referred to as a point
10 to multi point transfer system. A customary manner to transfer information to (and from) a single recipient is to use a so called point to point transfer system. A common disadvantage with a point to point system is that it is very expensive per unit of transferred information. A very
15 attractive advantage with using a DVB system for transfer of information is its extremely large bandwidth, i.e. it can transfer large (huge) amounts of data / information in a very short space of time. By locating a receiver / consumer of information 190 in a broadcasting system 145,
20 146, 147 the transfer of information can be directed to that locality 146, enabling simultaneous use of the network by spatially separated receivers making the transfer of information very cost effective. A DVB system can be of a SFN (Single Frequency Network) nature, be of a more
25 traditional television broadcasting nature with different frequency regions / cells 145, 146, 147 or a combination of both where there can be a SFN covering a nation or large region and also several different DVB frequency regions within the same coverage area, each of which can be a small
30 SFN system. It is possible to direct and send different information within a SFN as well as in the traditional cell structure. Sending different information in a SFN requires great care, but is possible. However, both methods preferably require that the locality of the receiver to be
35 known if transmission of information to a single

information consumer 190 is to be efficient. References in this application to the identification of a transmitter means identification of the number of transmitters in a single frequency network. Broadcasting of information in a DVB network is done by means of something called a transport stream that is transmitted at a predetermined carrier frequency from one or more transmitters. A transport stream is a multiplex of information comprising for example elementary streams for one or more programmes (i.e. programme channels such as BBC1 or SVT1 and not a time limited show), data, service information, conditional access control, and synchronization information to mention a few. The transport stream was devised for multi-programme applications, i.e. it will usually comprise elementary streams for more than one programme. An elementary stream can, for example, be sound (audio), video, teletext, and data, where, for example, a television broadcast (a programme) comprises several elementary streams such as video, mono audio, stereo audio, teletext etc. The transport stream according to DVB also comprises data structures comprising a multitude of information. The invention makes use of one or more pieces of information within these data structures in dependence on the specific DVB network. Specifically the invention makes use of a combination of one or more of the original network identification (`original_network_id`), the transport stream identification (`transportstream_id`), and the network identification (`network_id`) available in the data structures of a DVB transport stream.

According to the invention a secondary bidirectional transfer network 130 is used to transfer the information of the locality of the information consumer to the information transfer point 110. One method of acquiring the locality itself of the information consumer would be to use a GPS (Global Positioning System) and send the information to the

information transfer point 110 via the secondary bidirectional transfer network 130. However, it could be seen as a disadvantage at times to have to include a GPS with the information consumer.

5 Another method of locating the information consumer 190 would be to use the information that a cell based secondary bidirectional transfer network 130, such as GSM, generates. Unfortunately that information is usually the propriety of
10 the operator to that network and thus unavailable to users outside of that network. The use of that method would then be specific to a specific secondary bidirectional transfer network 130 which could be considered a disadvantage at times.

15 According to the invention information contained in the transport stream of a DVB broadcast and possibly the frequency of the transmitter of the received transport stream is used to locate the information consumer 190. A combination of one or more of either the transmitter frequency, the original network identification (original_network_id),
20 the transport stream identification (transportstream_id), and/or the network identification (network_id), all of the transport stream in question, will uniquely identify the transmitter or transmitters (in a SFN) and transport stream received by the receiver. Different DVB networks will
25 provide different types of information in the transport stream and provide a different meaning to original network identification, transport stream identification, and network identification. In some DVB networks it is sufficient with the original network identification which
30 gives the source of the transport stream and this together with the transport stream identification will uniquely identify where and to what transport stream the information that is to be transferred should be added. If there is no possibility to add the information to the currently

received transport stream then there might be a need to also make use of the network identification which should give the network from which the transport stream is received and possibly also the received frequency to thus be able to correctly identify the transmitter from which the transport stream is received. If the transmitter is identified then at least a rough location of the information consumer 190 with its DVB receiver 191 and secondary bidirectional transfer network transceiver 192 is possible to identify to enable alternative transport streams that the DVB receiver 191 is able to receive, for example from the identified transmitter, to be taken into consideration. In other DVB networks the original network identification might have no meaning but the network identification uniquely identifies transmitter and frequency. In these DVB networks it is fully sufficient to make use of the network identification and only optionally the transport identification. Thus according to the invention, in dependence of the DVB network in question, at least one of either the transmitter frequency, the original network identification, the transport stream identification, and/or the network identification is acquired and transferred to the information transfer point 110 via the secondary bidirectional transfer network 130. In still other embodiments of the invention the received programme/channel and/or information within the received transport stream such as server identification. One is, as described, enough to at least roughly locate the information consumer 190 with its DVB receiver 191 and secondary bidirectional transfer network transceiver 192. Optionally more receivable transport streams and their corresponding transmitter frequency, original network identification, transport stream identification, and/or network identification, are transferred and optionally together with their respective field strengths. This enables the information transfer point 110 to fairly

exactly pinpoint the information consumer 190 and thereby determine the most efficient manner in which to transfer the information. Criteria that the information transfer point 110 can use could for example be the direction of travel, free capacity in the different transport streams, the amount of information to transfer, what transport streams are receivable, urgency / priority of the request to transfer information, and so on.

Figure 2 shows a flow chart of a method according to the invention utilizing, for example, a system according to figure 1. The method according to figure 2 describes when a demand for transferring information to an information consumer arises from an information provider, i.e. a push system. In a first step, a demand step 210, a demand to transfer information to an information consumer originates at an information provider. This demand is transferred as a request to an information transfer point in a request step 220. The information transfer point executes a lookup in a lookup step 230 to establish the known methods of establishing contact with the information consumer. Based on the lookup in an establish contact step 240, contact with the information consumer is established. The step of establishing contact 240 can optionally involve the following substeps. Substep SBTN or DVB ? 241 establishes if the initial contact with the information consumer is to be done via the secondary bidirectional transfer network (SBTN) or via the digital video broadcasting network (DVB). This information is usually available and established in the lookup step 230. If the secondary bidirectional transfer network is to be used then a substep contact ? 242 determines if it is possible to establish contact with the information consumer. If it is possible to establish contact with the information consumer, then in substeps DVB on ? 243 and turn on 244 it is made sure that the DVB receiver of the information consumer is turned on

whereafter the procedure continues with step minimum info 250. If no contact was possible to establish in substep contact ? 242 due to, for example, the fact that the secondary bidirectional transfer network transceiver of the information consumer is turned off or the information transfer point has no or erroneous information about the secondary bidirectional transfer network of the information consumer, then one method to continue is to go to substep DVB broadcast 245. In the substep DVB broadcast 245 a general call is made via a part of or the complete DVB network to alert the information consumer that a demand to transfer information has arisen. If the general call is received by the information consumer in a substep received broadcast 246 then the information consumer should turn on its secondary bidirectional transfer network transceiver and confirm to the information transfer point in a substep confirm 247 that it has received the call and thereafter continue with step minimum info 250. On the other hand if the information transfer point does not receive a confirmation or any other contact with the information consumer within a predetermined space of time then in a substep timeout 248 the information provider is notified that no contact was possible to reach with the information consumer. After initial contact has been made with the information consumer then in the step minimum info 250 the information consumer transfers to the information transfer point via the secondary bidirectional transfer network transfer configuration information comprising at least one of either the transmitter frequency, the original network identification, transport stream identification, and/or network identification, of the transport stream that the DVB receiver of the information consumer can receive. Optionally in a substep optional info 251 the information consumer also provides the information transfer point with additional transfer configuration information such as additional receivable transport streams and corresponding

information, field strengths of received transmitters, optional transfer routes etc. Also optionally in a substep select 252 the information transfer point determines / selects an optimal route / transport stream to send the information. Finally in a transfer step 260 the information is transferred from the information provider to the information consumer via the digital video broadcasting network.

Figure 3 shows a flow chart of another method according to the invention utilizing, for example, a system according to figure 1. The method according to figure 3 describes when a demand for transferring information to an information consumer arises from the information consumer, i.e. a pull system. In a first step, a need step 210, a need for a transfer of information to the information consumer originates in the information consumer itself. In the optional substeps DVB on ? 311, turn on 312, SBTN on ? 313, and turn on 314 the information consumer makes sure that the necessary equipment is turned on. Thereafter the information consumer in the step minimum info 320 makes an initial contact with and also transfers to the information transfer point via the secondary bidirectional transfer network the request for information and transfer configuration information comprising at least one of either the transmitter frequency, the original network identification, the transport stream identification, and/or the network identification, of a transport stream that the DVB receiver of the information consumer can receive. Optionally in a substep optional info 321 the information consumer also provides the information transfer point with additional transfer configuration information such as additional transport streams, field strengths of received transmitters, optional transfer routes etc. In a data step 330 the information transfer point retrieves the requested information from an information provider. Optionally in a

substep confirmation 331 the information transfer point confirms to the information consumer if the requested information is available or not. Also optionally in a substep select 332 the information transfer point
5 determines / selects an optimal route / transport stream to send the information. Finally in a transfer step 360 the information is transferred from the information provider to the information consumer via the digital video broadcasting network.

10 Figure 4 shows a flow chart of how high security and error tolerance is accomplished according to one method of the invention which can be implemented in the methods according to figures 2 and 3 as substeps to the transfer steps 260 and 360 respectively. In a first step key 461, a crypto
15 key or the like is transferred to the information consumer via the secondary bidirectional transfer network. In a second step transfer 462, encoded information is transferred to the information consumer via DVB. The information is decoded / decrypted and a test is made in a
20 step OK ? 463 to determine if the information was received intact. If it was received without any errors then in a step confirmation 466 the information consumer can optionally confirm, via the secondary bidirectional transfer network, the reception of the information to the
25 information transfer point. To make the transfer as efficient as possible it is probably in most embodiments of the invention suitable not to confirm correctly received information. On the other hand if there is an error in the received information then the information consumer in a
30 step demand resend 464 makes a demand, via the secondary bidirectional transfer network, to the information transfer point to resend the faulty information. The information is resent in a step resend 465 over the DVB network after which the procedure proceeds with step OK ? 363.

The present invention can be put into apparatus-form either as pure hardware, as pure software or as a combination of hardware and software. If the method according to the invention is realised in the form of software, it can be completely independent or it can be one part of a larger program. The software can suitably be located in a general purpose computer or in a dedicated computer.

As a summary, the invention can basically be described as a method which provides an efficient manner of transferring information to an information consumer within a DVB network using a secondary bidirectional transfer network.

The invention is not limited to the embodiments described above but may be varied within the scope of the appended patent claims.

CLAIMS

1. A method for transferring information from an information provider to a predetermined information consumer by means of a digital video broadcasting system to a digital video broadcasting receiver of the predetermined information consumer and by means of support of a secondary bidirectional transfer network to thereby enable an efficient information transfer when a demand to transfer information to the predetermined information consumer is originated by the information provider, characterized in that the method comprises the following steps:
- the information provider establishing contact with an information transfer point for requesting transfer of information to the predetermined information consumer;
 - the information transfer point retrieving access information of the predetermined information consumer based on the request from the information provider;
 - the information transfer point establishing an initial contact with the predetermined information consumer based on the retrieved access information about the predetermined information consumer;
 - the predetermined information consumer providing the information transfer point, via the secondary bidirectional transfer network, with transfer configuration information comprising at least one of either a transmitter frequency, an original network identification, a transport stream identification, and/or a network identification of a transport stream of a digital video broadcasting transmitter that the digital video broadcasting receiver of the predetermined information consumer can receive;

- 5 - the information provider via the information transfer point, based on the transfer configuration information, transferring information over the digital video broadcasting system to the digital video broadcasting receiver of the predetermined information consumer to thereby transfer information from the information provider to the predetermined information consumer in an efficient manner.
- 10 2. The method according to claim 1, characterized in that based on the transfer configuration information the information transfer point can transfer the information to the digital video broadcasting receiver of the predetermined information consumer over a selected transmitter or transmitters in the digital video broadcasting system.
- 15 3. The method according to claim 1 or 2, characterized in that the access information of the predetermined information consumer provides information of how contact can be made with the predetermined information consumer via the secondary bidirectional transfer network and that the step of establishing an initial contact with the predetermined information consumer is done via the secondary bidirectional transfer network based on the access information of the predetermined information consumer.
- 20 4. The method according to claim 3, characterized in that if the step of establishing initial contact with the predetermined information consumer via the secondary bidirectional transfer network cannot be concluded then a broadcast over the digital video broadcasting system is performed to alert the predetermined information consumer to establish contact with the information transfer point.
- 30

5. The method according to claim 4, **characterized in that** if the information transfer point after a timeout has not been able to establish contact with the predetermined information consumer then the information provider is notified that the predetermined information consumer cannot be positively contacted.

6. The method according to claim 1 or 2, **characterized in that** the access information of the predetermined information consumer either provides no information on how contact can be made with the predetermined information consumer via the secondary bidirectional transfer network or the access information provides information of how the predetermined information consumer is to be contacted by means of broadcasting over the digital video broadcasting system to thereby alert the predetermined information consumer to establish contact with the information transfer point and that the step of establishing an initial contact with the predetermined information consumer is done via a broadcast over the digital video broadcasting system to thereby alert the predetermined information consumer to establish contact with the information transfer point.

7. The method according to claim 6, **characterized in that** if the information transfer point after a timeout has not been able to establish contact with the predetermined information consumer then the information provider is notified that the predetermined information consumer cannot be positively contacted.

8. The method according to any one of claims 1 to 7, **characterized in that** the transfer configuration information further also comprises at least one of either a transmitter frequency, an original network identification, a transport stream identification, and/or a network identification, of transport streams of

transmitters receivable by the digital video broadcasting receiver of the predetermined information consumer, the field strengths of receivable transmitters, what programme if any the digital video broadcasting receiver of the predetermined information consumer is currently receiving, or alternative information transfer routes.

9. The method according to any one of claims 1 to 8, characterized in that the information transfer point based on the transfer configuration information determines when and with what transport stream the information transfer is to take place and by means of the secondary bidirectional transfer network notifies the predetermined information consumer of when and with what transport stream the information transfer is to take place.

10. The method according to any one of claims 1 to 9, characterized in that the method further comprises the following steps:

- the information transfer point transferring a crypto key to the predetermined information consumer by means of the secondary bidirectional transfer network before, during or after transferring information over the digital video broadcasting system;
- encoding the information to be transferred either by the information provider or by the information transfer point;
- decoding by means of the transferred crypto key the transferred information either in the digital video broadcasting receiver of the predetermined information consumer or by the predetermined information consumer.

11. The method according to any one of claims 1 to 10, characterized in that the method further comprises the following steps:

- transferring checksums or the like, of the information that has or will be transferred via the digital video broadcasting system, via the secondary bidirectional transfer network to the predetermined information consumer;
5
- checking the transferred information if it is uncorrupted based on the transferred checksums or the like, checking in the digital video broadcasting receiver of the predetermined information consumer or
10 by the predetermined information consumer;
- the digital video broadcasting receiver of the predetermined information consumer or the predetermined information consumer requesting, via the secondary bidirectional transfer network, to the
15 information transfer point a resending of corrupted transferred information.

12. A method for transferring information from an information provider to an information consumer by means of a digital video broadcasting system to a digital video
20 broadcasting receiver of the information consumer and by means of support of a secondary bidirectional transfer network to thereby enable an efficient information transfer when a demand to transfer information to the information consumer is originated by the information consumer,
25 **characterized in that** the method comprises the following steps:

- the information consumer establishing an initial contact with an information transfer point via the secondary bidirectional transfer network with a
30 request for an information transfer from the information provider to the information consumer;
- the information consumer providing the information transfer point, via the secondary bidirectional transfer network, with transfer configuration
35 information comprising at least one of either a

transmitter frequency, an original network
identification, a transport stream identification,
and/or a network identification of a transport stream
of a digital video broadcasting transmitter that the
5 digital video broadcasting receiver of the information
consumer can receive;

- the information transfer point retrieving the requested information;
- the information provider via the information transfer point, based on the transfer configuration information, transferring information over the digital video broadcasting system to the digital video broadcasting receiver of the information consumer to thereby transfer information from the information provider to the information consumer in an efficient way.

13. The method according to claim 12, characterized in that based on the transfer configuration information the information transfer point can transfer the information to the digital video broadcasting receiver of the information consumer over a selected transmitter or transmitters in the digital video broadcasting system.

14. The method according to any one of claims 12 or 13, characterized in that the transfer configuration information further also comprises at least one of either a transmitter frequency, an original network identification, a transport stream identification, and/or a network identification, of transport streams of transmitters receivable by the digital video broadcasting receiver of the predetermined information consumer, the field strengths of receivable transmitters, what programme if any the digital video broadcasting receiver of the predetermined information consumer is currently receiving, or alternative information transfer routes.

15. The method according to any one of claims 12 to 14,
characterized in that the information transfer point based
on the transfer configuration information determines when
and with what transport stream the information transfer is
5 to take place and by means of the secondary bidirectional
transfer network notifies the information consumer of when
and with what transport stream the information transfer is
to take place.
16. The method according to any one of claims 12 to 15,
10 characterized in that the information transfer point
confirms the availability or non-availability of the
requested information to the information consumer via the
secondary bidirectional transfer network or via the digital
video broadcasting system.
17. The method according to any one of claims 12 to 16,
15 characterized in that the method further comprises the
following steps:
- the information transfer point transferring a crypto
key to the information consumer by means of the
20 secondary bidirectional transfer network before,
during or after transferring information over the
digital video broadcasting system;
 - encoding the information to be transferred either by
the information provider or by the information
25 transfer point;
 - decoding by means of the transferred crypto key the
transferred information either in the digital video
broadcasting receiver of the information consumer or
by the information consumer.
18. The method according to any one of claims 12 to 17,
30 characterized in that the method further comprises the
following steps:

- transferring checksums or the like, of the information that has or will be transferred via the digital video broadcasting system, via the secondary bidirectional transfer network to the information consumer;
 - 5 - checking the transferred information if it is uncorrupted, based on the transferred checksums or the like, checking in the digital video broadcasting receiver of the information consumer or by the information consumer;
 - 10 - the digital video broadcasting receiver of the information consumer or the information consumer requesting, via the secondary bidirectional transfer network, to the information transfer point a resending of corrupted transferred information.
- 15 19. A method for transferring information from an information provider to an information consumer by means of a digital video broadcasting system to a digital video broadcasting receiver of the information consumer and by means of support of a secondary bidirectional transfer
- 20 network to thereby enable an efficient information transfer when a demand to transfer information to the information consumer is originated by the information consumer, **characterized in that** the method comprises the following steps:
- 25 - the information consumer establishing an initial contact with an information transfer point via the secondary bidirectional transfer network with a request for an information transfer from the information provider to the information consumer;
 - 30 - the information consumer providing the information transfer point, via the secondary bidirectional transfer network, with transfer configuration information comprising at least one of either what currently received programme/transport stream or
 - 35 information therein that the digital video

broadcasting receiver of the information consumer receives;

- the information transfer point forwarding the information request and the transfer configuration information to the information provider;
- the information provider, based on the transfer configuration information, transferring information over the digital video broadcasting system to the digital video broadcasting receiver of the information consumer to thereby transfer information from the information provider to the information consumer in an efficient way.

20. The method according to claim 19, characterized in that the transfer configuration information further also comprises at least one of either a transmitter frequency, an original network identification, a transport stream identification, and/or a network identification of a transport stream of a digital video broadcasting transmitter that the digital video broadcasting receiver of the information consumer can receive.

21. The method according to any one of claims 19 or 20, characterized in that based on the transfer configuration information, the information to be transferred to the digital video broadcasting receiver of the information consumer is transferred over a selected transmitter or transmitters in the digital video broadcasting system.

22. The method according to any one of claims 19 to 21, characterized in that the transfer configuration information further also comprises at least one of either a transmitter frequency, an original network identification, a transport stream identification, and/or a network identification, of transport streams of transmitters receivable by the digital video broadcasting

receiver of the predetermined information consumer, the field strengths of receivable transmitters, or alternative information transfer routes.

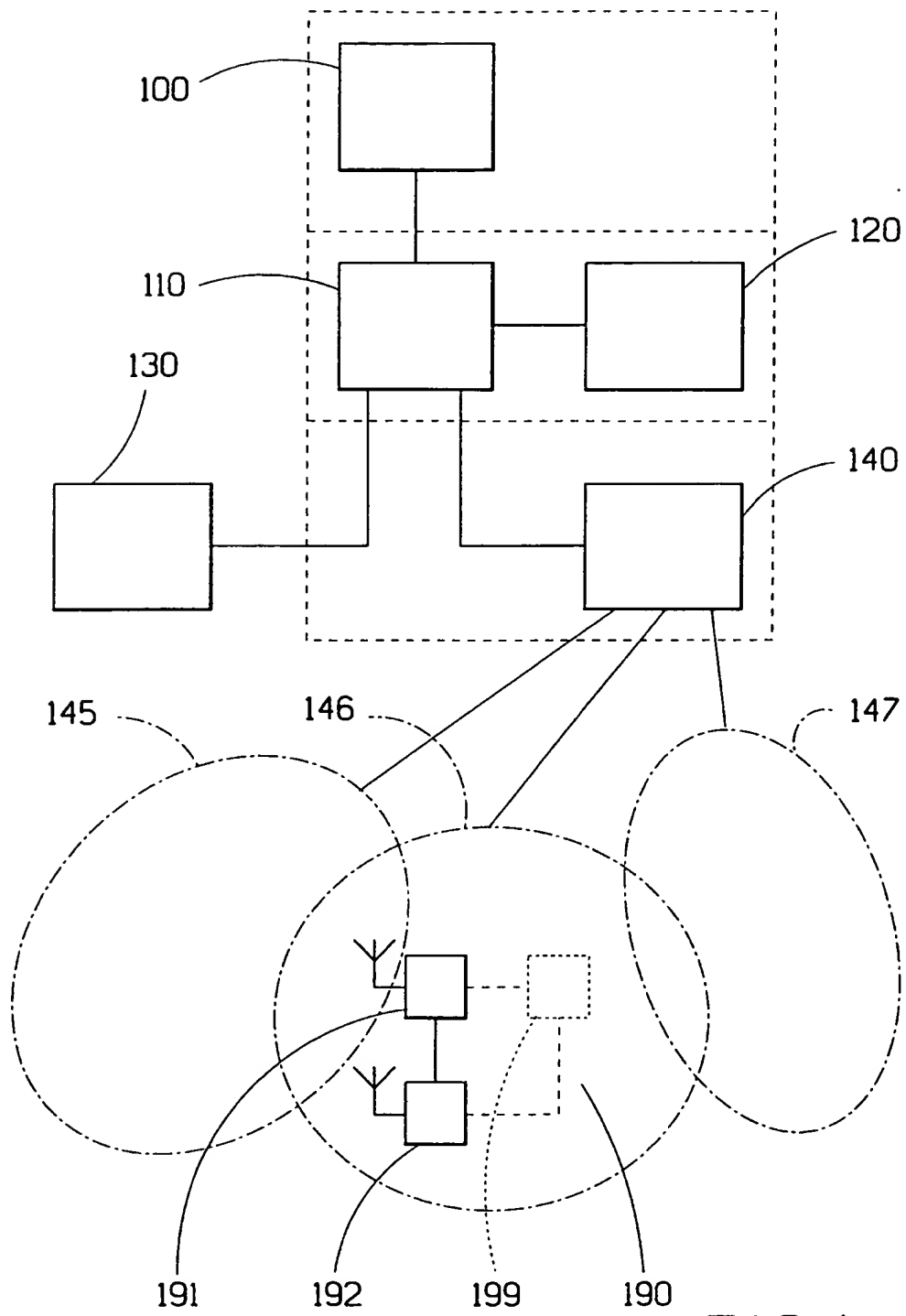
23. The method according to any one of claims 19 to 22, characterized in that the method further comprises the following steps:

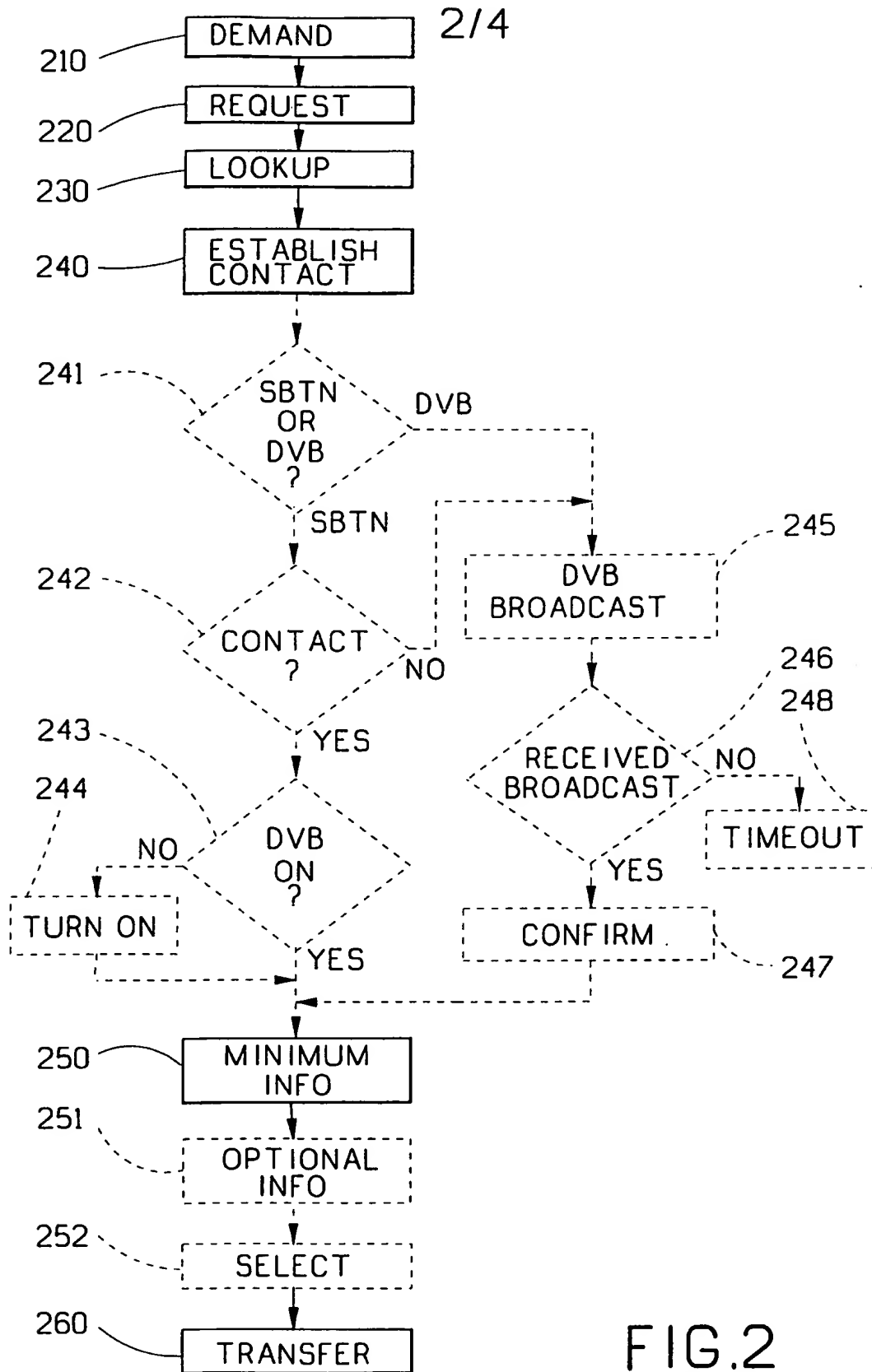
- the information transfer point transferring a crypto key to the information consumer by means of the secondary bidirectional transfer network before, during or after transferring information over the digital video broadcasting system;
- encoding the information to be transferred by the information provider;
- decoding by means of the transferred crypto key the transferred information either in the digital video broadcasting receiver of the information consumer or by the information consumer.

24. The method according to any one of claims 19 to 23, characterized in that the method further comprises the following steps:

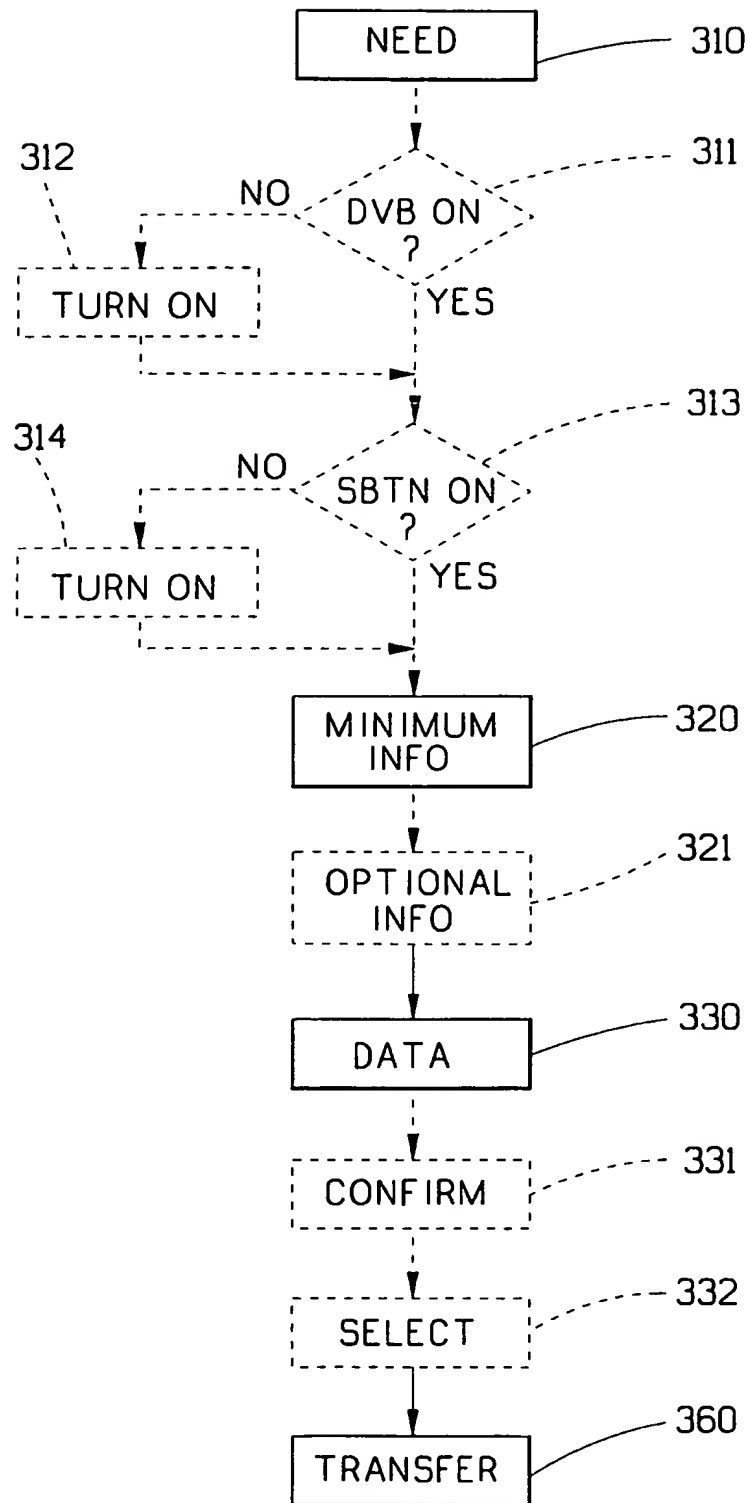
- transferring checksums or the like, of the information that has or will be transferred via the digital video broadcasting system, via the secondary bidirectional transfer network to the information consumer;
- checking the transferred information if it is uncorrupted, based on the transferred checksums or the like, checking in the digital video broadcasting receiver of the information consumer or by the information consumer;
- the digital video broadcasting receiver of the information consumer or the information consumer requesting, via the secondary bidirectional transfer network, to the information transfer point a resending of corrupted transferred information.

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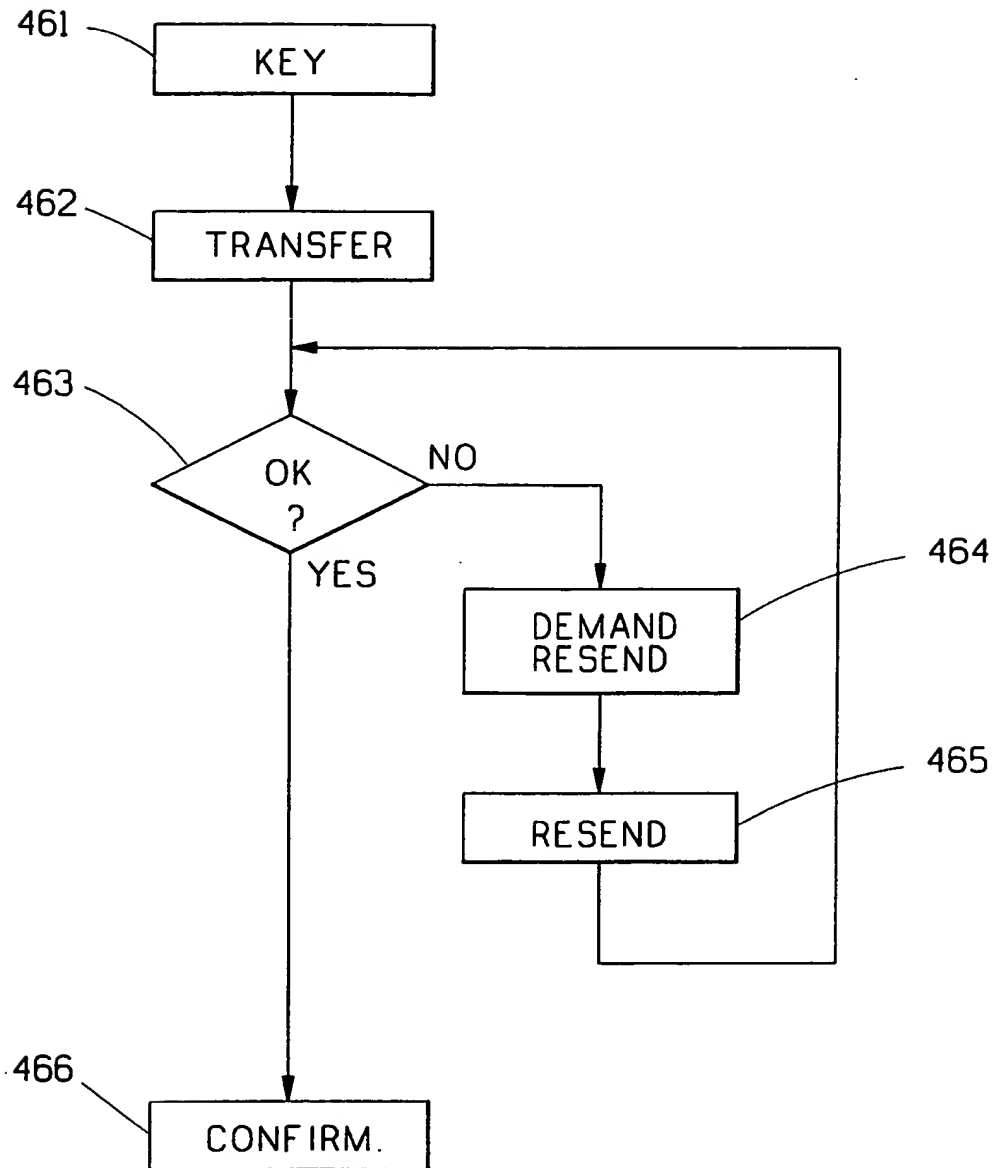
FIG.1



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FIG.3

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FIG.4

INTERNATIONAL SEARCH REPORT

International application No. .

PCT/SE 98/02378

A. CLASSIFICATION OF SUBJECT MATTER		
IPC6: H01H 1/00 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC6: H01H		
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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	US 5512937 A (JOHN D. BEIERLE), 30 April 1996 (30.04.96), column 2, line 38 - column 3, line 10 --	1-11
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
3 May 1999		05 -05- 1999
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86		Authorized officer Kristina Pederson Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 98/02378

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 5151782 A (ANDREW G. FERRARO), 29 Sept 1992 (29.09.92), column 3, line 54 - column 4, line 51; column 5, line 47 - line 63, abstract --	12-24
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Information on patent family members

07/04/99

International application No.

PCT/SE 98/02378

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